Title: Sweet Math

Brief Overview:

The activities in this unit will expose students to a practical application of gathering data, developing and interpreting graphs, exploring pattern relationships, and using computation to show number relationships. Students will apply problem solving knowledge to real-world situations. The focus will be on computing equivalent fractions, decimals, and percentages.

Link to Standards:

- **Problem Solving** Students will investigate and use data to solve problems.
- **Communication** Students will model situations using written, pictorial, graphical, and algebraic methods. Students will discuss mathematical ideas and make connections.
- **Reasoning** Students will understand and apply deductive and inductive reasoning. Students will apply reasoning processes using proportions and graphs. Students will validate their own thinking.
- **Connections** Students will be able to connect math to other subjects and to real-world situations.
- **Number Relationships** Students will investigate relationships among fractions, decimals and percents. Students will represent numerical relationships using graphs.
- **Number Systems & Number Theory** Students will understand how the basic arithmetic operations are related to one another.
- **Computation & Estimation** Students will use computation, estimation, and proportions to solve problems.
- **Patterns & Functions** Students will describe and represent relationships using tables and graphs. Students will create a variety of patterns.
- **Algebra** Students will apply algebraic methods to solve real-world mathematical problems.
- **Statistics** Students will collect and organize data. Students will construct, read and interpret tables, charts and graphs. Students will make inferences and develop convincing arguments that are based on analyzed data.

- **Probability** Students will make predictions.
- **Geometry** Students will create and explore geometric figures.
- **Measurement** Students will apply measurement skills.

Grade/Level:

Grade 5

Duration/Length:

This unit is designed for 7 one-hour class sessions.

Prerequisite Knowledge:

Students should have working knowledge of the following:

- names of geometric shapes (polygons and quadrilaterals)
- patterns
- basic skills (addition, subtraction, multiplication, division)
- graphing

Objectives:

Students will be able to:

- estimate and make predictions.
- sort, gather, and record information.
- create graphs and charts to organize data.
- make inferences based on gathered data in order to solve equations.
- use objects to simulate geometric figures.
- illustrate patterns created.
- use computation methods to find equivalent fractions, decimals and percentages.
- write a persuasive letter defending economic decisions.

Materials/Resources/Printed Materials:

- The Chocolate Touch by Patrick Skene Catling, copyright 1952 Bantom Books, Dell Pub. Grp., Inc.
- Individual snack size bags of M&M's (2 per student)
- Individual wrappers saved from Day 1
- Two 1 lb. bags of M&M's
- Crayons
- Pencils
- Student Worksheets

- Teacher Resource Sheets #1-11
- Overhead projector and transparencies
- Assorted magazines and newspapers

Development/Procedures:

Day 1:

- Read chapter one of The Chocolate Touch to students. (Read at various times throughout the unit.)

- Distribute one individual bag of M&M's to each student. Tell students not to touch the bag until instructed to do so.

- Distribute Teacher Resource #1.

- Have students estimate and record the number of M&M's in the bag.

- Have students open the bag to count and record the actual number of M&M's.

- Have students sort M&M's by color and record data on Teacher Resource #1.

- Have students solve problems on Teacher Resource #2.

- Allow students to consume M&M's.

Day 2:

- Distribute second individual bag of M&M's to students. On overhead, display sample of Teacher Resource #3. Give directions and have students use their M&M's to solve the problem.

- Review geometric shapes. Have students practice creating shapes using their M&M's. Using M&M's, make shapes that resemble squares, triangles, circles, quadrilaterals and polygons.

- Have students work with partners to look for color patterns in each other's work.

- Generate a discussion about color patterns. Have students create patterns using M&M's on the Teacher Resource #4 grid paper. Using crayons, students should transfer created patterns to the grid paper.

Day 3:

- Distribute Teacher Resource #5. Using data collected on Day 1 (Teacher Resource #1), construct a bar graph showing the number of M&M's students recorded for each color.

- Generate a discussion on the use of graphs in real-world situations. Show examples of graphs from various resources. Generate a response by questioning students about how they can use the graph they created. Be sure to direct discussion to comparisons.

- Have students use their bar graph on Teacher Resource #5 to check greater than, less than on Teacher Resource #2.

Day 4:

- Working in groups, have students decide on a fraction which represents something visible about their group. (i.e, 3 out of 4 are wearing blue shirts) Have students come to the front of the class while remaining groups observe and try to guess how they created their fraction. Have students record the group's fraction on overhead chart while remaining students record information on individual charts. Distribute Teacher Resource #6.

- Using one of the group's examples, direct students in finding the equivalent decimal.

- Using Teacher Resource #6, have students convert each fraction to an equivalent decimal.

Day 5:

- Using Teacher Resource #7, have students answer the questions in order to introduce percentages. Have students share responses in order to generate discussion of percentages.

- Have students look through magazines and newspapers to find examples of decimals, fractions and percentages.

- Using Teacher Resource #6, show students how to convert decimals to percentages.

- Have students convert remaining decimals to percentages.

Day 6:

- Have students use bar graphs to determine fractional parts for each color. Record fractions on Teacher Resource #8.

- Using Teacher Resource #8, have students demonstrate mastery of converting fractions to decimals and percentages.

Day 7:

- Display a 1 lb. bag of M&M's and several individual size wrappers with prices of each. Have students predict which package would be the "better buy". (example: one 1 lb. Bag or 4 individual bags)

- Use students' responses to generate a discussion on ways to decide which is the "better buy".

- Have students write a persuasive letter to their parents defending their decision for the most economical way to purchase M&M's for a birthday party for 15 people. Use Teacher Resource #9 as a prompt.

Performance Assessment:

Students can be assessed on the following criteria:

- Pre-assessment Teacher Resource #7
- Informal Assessment Teacher Resources #1, #4 and #6
- Formal Assessment Teacher Resources #2 and #5
- Daily Oral Discussions
- Teacher Questioning
- Teacher Resource #8-Final Evaluation
- Persuasive Writing Teacher Resource #9 (rubric for writing is Teacher Resource #10)
- Create an advertisement for M&M's and perform for the class

Extension/Follow Up:

- Create a collage showing uses of fractions, decimals and percentages in real-world situations
- Create a story using candy wrappers
- Have students bring in examples of candies that are made in the form of geometric shapes
- Make homemade candy using measurement skills
- Make a reward wreath using candy for positive reinforcement
- M&M's Trivia Quiz Teacher Resource #11

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References:

Aims Educational Foundation, 1987, 1991
Mailbox Magazine, June/July 1996 p. 59
The Chocolate Touch by Patrick Skene Catling
Learning 93, March 1993, p. 40
Harriet Donofrio, Director, Delaware Teacher Center (Trivia Quiz)

SWEET MATH

1. Estimate the total number of M & M's in your bag. _____

2. What is the weight of your bag of M & M's ? _____

3. Open your bag of candy. Pour out the M & M's and count them. What is the actual number of M & M's? _____

4. Sort the M & M's by color. Count how many you have of each color and record it on the chart below.

COLOR	NUMBER OF M & M's
GREEN	
ORANGE	
RED	
BLUE	
YELLOW	
DARK BROWN	
LIGHT BROWN	

5. Add all of the colors together. Does the sum match the number you wrote for the actual number? _____

Teacher Resource 2

SWEET MATH

Answer the following:

1. Which color do you have the most of? _____
2. Which color do you have the least of? _____
3. How many more of the color in number 1 than the color in number 2 do you have? _____

Answer the following using **>, <,** and **=** signs:

4. Green _____ Orange
5. Red _____ Blue
6. Yellow _____ Dark Brown
7. Brown _____ Blue
8. Yellow _____ Red
9. Orange _____ Green
10. Blue _____ Light Brown

Solve the following equations:

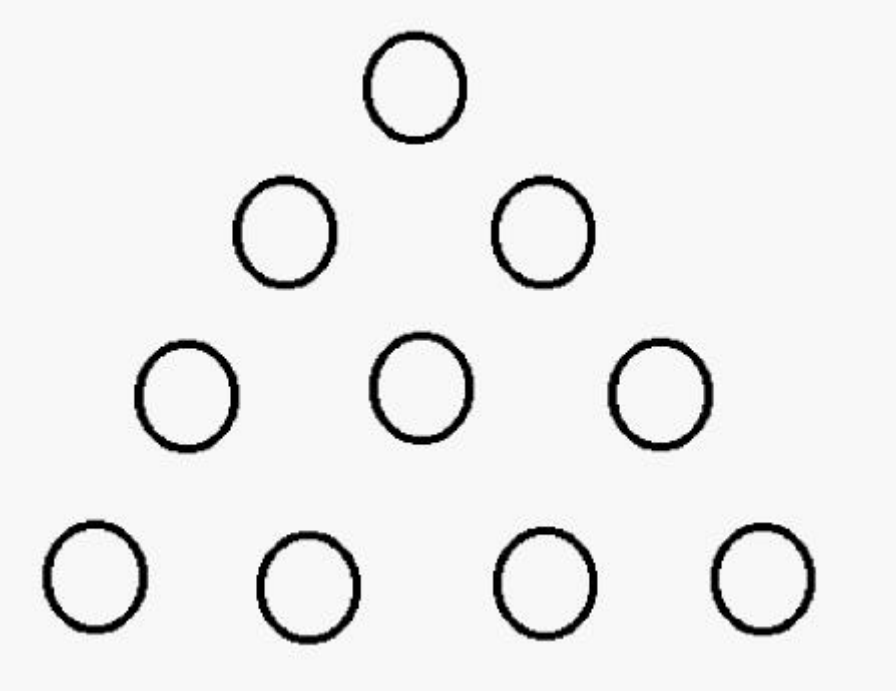
11. Orange + Green = _____
12. Red + Blue = _____
13. Yellow + Dark Brown = _____
14. Light Brown X Green = _____
15. Blue X Orange = _____
16. Red X Yellow = _____
17. Total number of M & M's - Green = _____
18. Total number of M & M's - Red = _____
19. Total number of M & M's - Light Brown = _____

Answer the following:

20. Write down the total number of M & M's in your bag. _____
21. Divide your M & M's into groups of 4. How many groups do you get? _____
22. Divide your M & M's into groups of 5. How many groups do you get? _____
23. Eat any 2 M & M's. How many do you have now? _____
24. Eat any 3 M & M's. How many do you have left? _____

Save the rest of your M & M's until you are given more directions.

M & M's Brainteaser

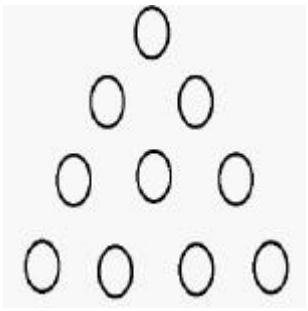


1) Using your M & M's make a triangle like the one on the overhead.

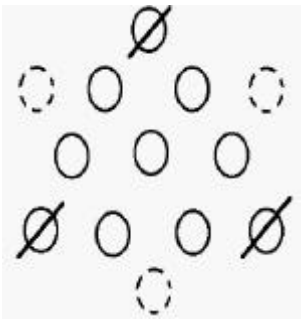
2) Try to make an upside down triangle by moving only three M & M's.

Teacher Resource #3 Solution

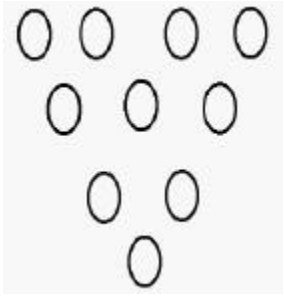
Generate a high interest in problem solving by pairing a brainteaser with a popular snack! Form a triangle on the overhead projector as shown, using ten M & M's. Give each student one snack size bag of M & M's. Ask them to duplicate the triangle on their desk. Ask the students to turn this triangle upside down by moving only 3 M & M's.



Start



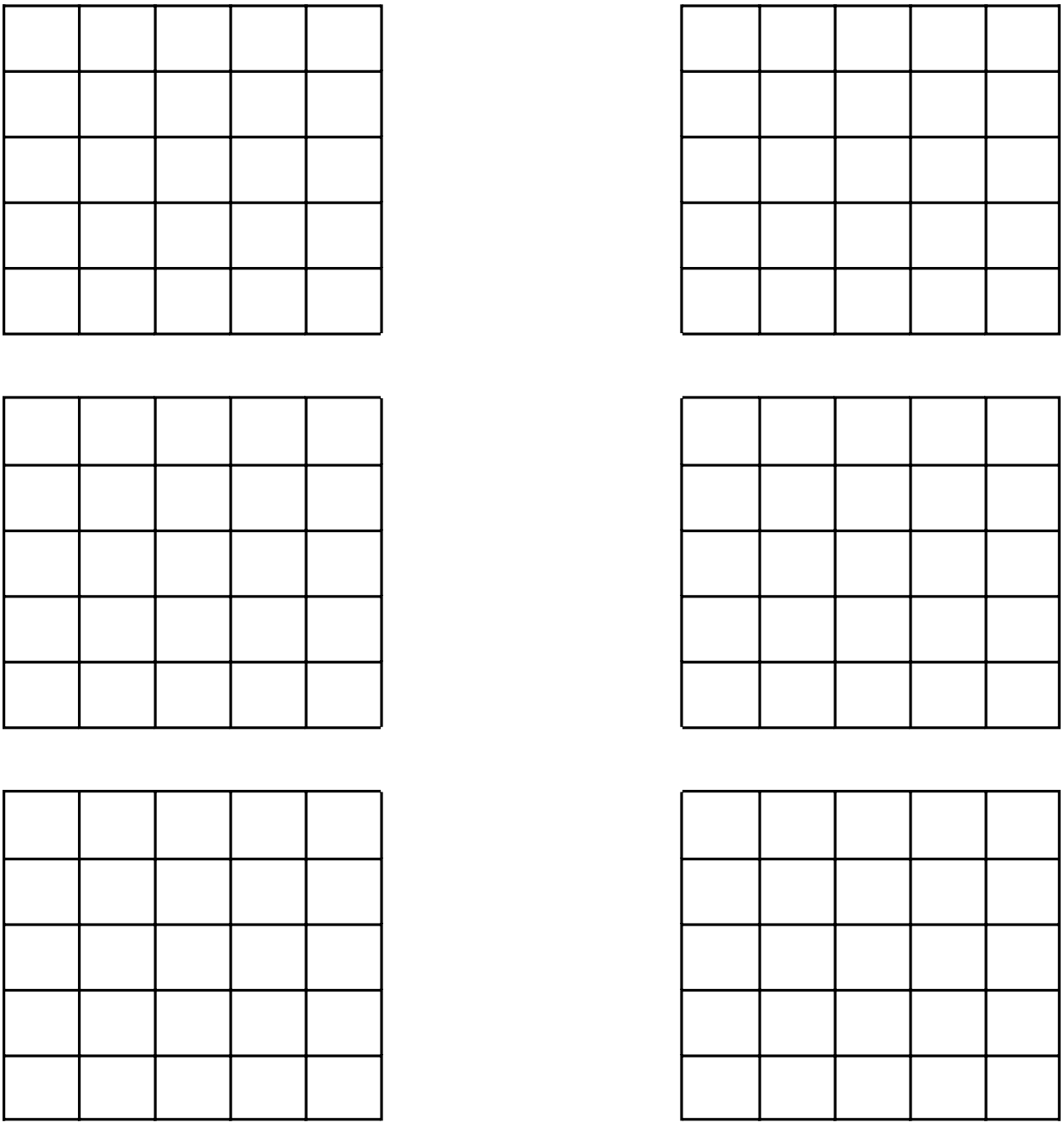
Solution



Finish

Teacher Resource 4

PATTERNS



Teacher Resource #5

Dark Brown	Green	Orange	Yellow	Red	Blue	Light Brown	

Teacher Resource #6

GROUP	FRACTIONS	DECIMALS	PERCENTAGES

*Write a sentence and a formula explaining the process for solving each.

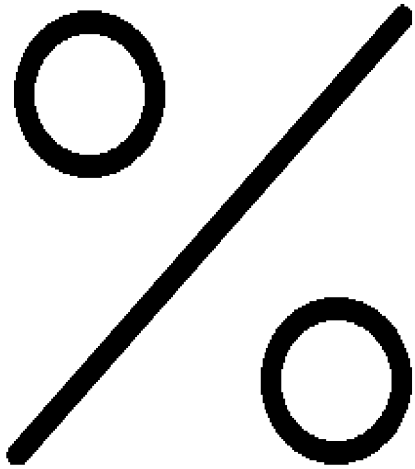
Fraction:

Decimal:

Percentage:

MYSTERY SYMBOL

Teacher Resource #7



What am I?

When have you seen me?

How can you use me?

M & M'S MATH

Teacher Resource #8

Color	Fraction	Decimal	Percentage		
Purple	5/10	.50	50%		
Total					

What conclusions can you make based on the data you have collected on your chart?

Writing Prompt Teacher Resource #9

You are having a birthday party! You've decided to give your fifteen guests M & M's as a treat. Write a persuasive letter to your parents explaining which way is the most economical to purchase the M & M's, by the pound bag or by individual bags. Be sure you defend your opinion by citing examples from our lesson.

Name_____ Teacher Resource #10

Date_____

Scoring Criteria for Delaware Assessment

DEVELOPMENT				
➨ Enough information is added to make writing interesting.	1	2	3	4
➨ There are enough details to explain topic.	1	2	3	4
➨ Details are specific.	1	2	3	4
➨ Details make sense.	1	2	3	4
➨ Paper fulfills intended purpose for writing.	1	2	3	4
ORGANIZATION				
➨ Introduction is effective.	1	2	3	4
➨ Paper is unified with smooth transitions.	1	2	3	4
➨ There is a logical progression of ideas.	1	2	3	4
➨ Piece stays on topic.	1	2	3	4
➨ Closure is effective.	1	2	3	4
SENTENCE FORMATION				
➨ Sentences are complete.	1	2	3	4
➨ Sentences are varied in length and structure.	1	2	3	4
WORD CHOICE AND STYLE				
➨ Descriptive adjectives are used.	1	2	3	4
➨ Descriptive adverbs are used.	1	2	3	4
➨ Descriptive action words are used.	1	2	3	4
CONVENTIONS				
➨ Capital letters are used correctly.	1	2	3	4
➨ End punctuation is used correctly.	1	2	3	4
➨ Misspelled words are corrected to the best of the child's ability.	1	2	3	4
➨ Pronouns make sense.	1	2	3	4
➨ Apostrophes are used in contractions.	1	2	3	4
➨ Commas are used when needed.	1	2	3	4
➨ Subjects and verbs agree.	1	2	3	4

Overall Score: _____

Comments: _____

_____

Teacher Resource #11

M & M's Trivia Quiz

1. How long have M & M's been made?
2. Which color do you find the most of in the M & M's bag?
3. Do all M & M's colors taste the same?
4. What color was in the original M & M's mix that is missing now?
5. How many M & M's are made every day?
6. Which came first -- peanut or plain?

ANSWERS

1. Challenge research
2. Dark Brown
3. Yes
4. Violet
5. About 1 million
6. Plain